

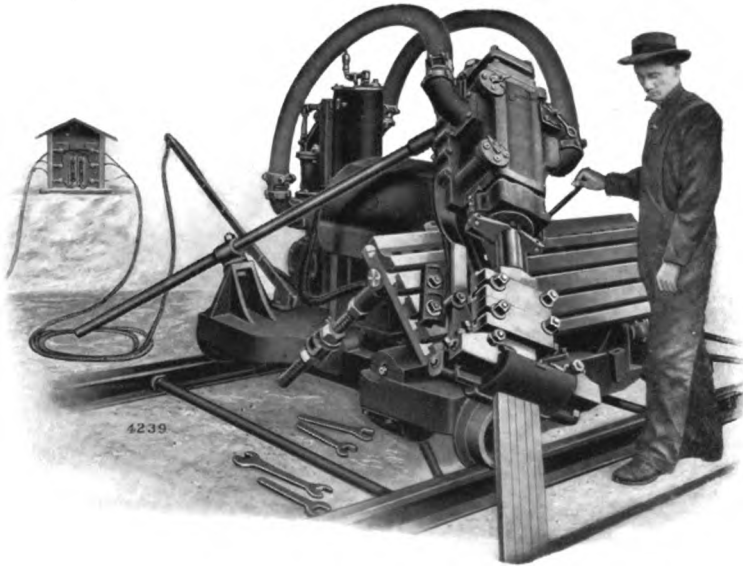
# THE GIBSON-INGERSOLL "Electric-Air" Track Channeler

INGERSOLL-RAND COMPANY

11 BROADWAY, NEW YORK

Form No. 6102

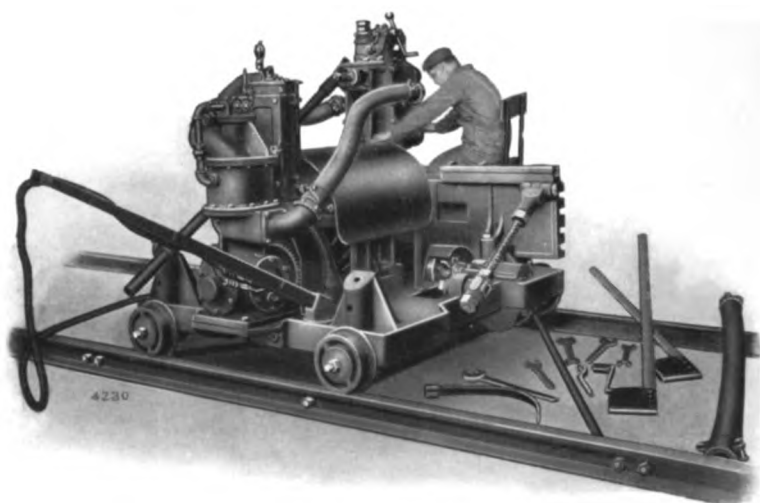
April, 1910



Front view of the "Electric-Air" Channeler, showing it adjusted for making a transfer cut

**E**LECTRIC power has become a common feature of mining and industrial operation, in which it has gained a firm foothold on grounds of convenience, economy and adaptability. But the quarry field has only recently yielded to the current tendency toward electrical operation.

The reason for this has been that the highly specialized process of stone quarrying has offered difficulties to be overcome only by the use of steam or compressed air in percussive machines. Until



A rear view of the "Electric-Air" Channeler, showing the pulsator

a recent date the drilling and channeling of stone has never been successfully accomplished by means of electric power.

With the advent of the successful "Electric-Air" Rock Drill and the "Electric-Air" Track Channeler, however, these difficulties have been overcome; and the modern stone quarry may be electrically equipped throughout, meaning a great advance in the economy and convenience of quarry operations.

The "Electric-Air" Drill, the only practical and successful machine ever offered for drilling rock by electric power, is one of the standard Ingersoll-Rand products and is described in Bulletin No. 4109. More than 700 of these machines in operation for all purposes all over the world attest the complete success of this device.

## The "Electric-Air" Channeler

The present Bulletin is devoted to the "Electric-Air" Track Channeler, which brings to the quarrying of dimension stone the flexibility and economy of electric transmission and the efficiency of the electric generator and motor, in combination with the sturdy reliability, large capacity and "stand-up" qualities of the compressed air or steam channeler.

This distinctly new machine has demonstrated its entire success in many instances. Notable among these are: the Vermont Marble Co., the largest marble producing concern in the world, which uses seven "Electric-Air" Channelers and thirteen "Electric-Air" Drills; the Dover White Marble Co., South Dover, New York, which uses five "Electric-Air" Channelers and three "Electric-Air" Drills; the Colorado Yule Marble Co. with three "Electric-Air" Channelers; and the Crystal River Marble Co. in Colorado.

## **The "Electric-Air" Principle**

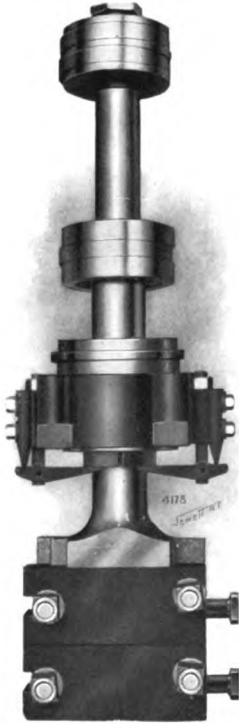
At this point let it be clearly understood that the "Electric-Air" Channeler is more than an air channeler with a portable electric driven air compressor. The device represents a complete system in which pulsations of compressed air, produced by a tandem single-acting pulsator driven by a standard electric motor, are applied to the piston of the cutting engine. There is nothing electrical about it, except the motor prime mover. The air is never exhausted or discharged to atmosphere, but is simply pulsed back and forth under pressure in a closed circuit. For every revolution or double stroke of the pulsator there is a blow and return of the channeler piston with its steels. Thus the speed of the cutting engine conforms exactly with the speed of the pulsator, and the simple speed controller on the motor affords the necessary speed variation in the cutting engine. There is no rigid connection between the motor pulsator and the cutting engine. Two short lengths of hose connect these parts and act as ports within which the air plays back and forth.

## **Channeler Essentials**

Any new device, to gain acceptance in a productive industry, must either increase the output or reduce the cost of operations. Analyzed on this basis the four requirements of any successful stone channeler are found to be: economy in the use of power; low cost of up-keep or maintenance; ready adjustability to all classes of rock and to all working conditions; and large cutting capacity. It remains to be shown how the "Electric-Air" Channeler meets these requirements.

## Power Economy

The ordinary air or steam-driven channeler takes at each stroke a full cylinder of air or steam, and exhausts or discharges it to atmosphere at practically full pressure. No advantage is taken of the expansive properties of the air or steam, the power of which is wasted.



The piston, lower head and chuck of the "Electric-Air" Channeler

The "Electric-Air" Channeler operates by air under a low pressure which is simply a transmitting agent between the piston of the pulsator and the piston of the cutting engine. The object of slightly compressing the air is to give it a greater density for the transmission of the pulsations imparted to it by the pulsator. In fact, the air is simply an unwearing, unbreakable cushion or spring between the pulsator and chopper; the pressure in the air is equivalent to a higher tension in the spring. Practically the only loss of power is that due to friction; and this is much lower than in the ordinary channeler, owing to the superior lubrication system and to the absence of any valve movement. As a matter of fact the actual requirements in three comparative cases are as given below.

### Air Driven Channeler

325 to 450 cubic feet of free air per minute at 100 lbs., corresponding to 55 to 75 compressor I.H.P.

### Steam Driven Channeler

27 to 35 Boiler H.P.

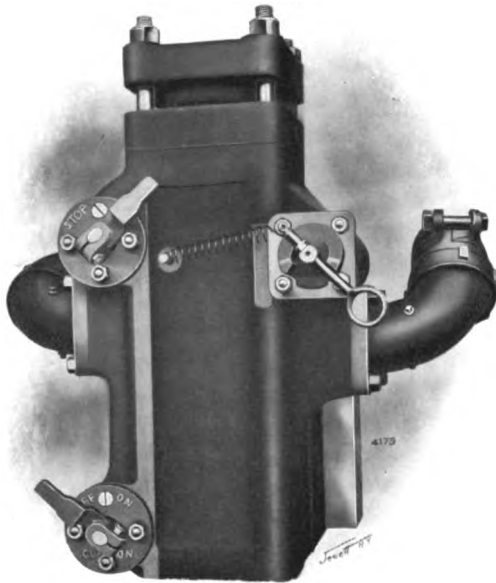
### "Electric-Air" Channeler

10 to 12 Motor H.P., corresponding to about 18 steam I.H.P. at the generating plant.

That these are not theoretical figures is evidenced by the fact that the "Electric-Air" Channelers used by the Colorado Yule Marble Co. are regularly cutting channels to an average depth of 9 ft. with a power consumption of only 8 K.W. or 10 2/3 H.P.

## Low Cost of Maintenance

The extreme simplicity of the "Electric-Air" Channeler results in an endurance bringing the repair or maintenance cost below all former figures in channeler practice. There is only one moving part, the piston, as shown in the illustration herewith. There are no valves, no valve chest, no valve gear to get out of order and lose adjustment.

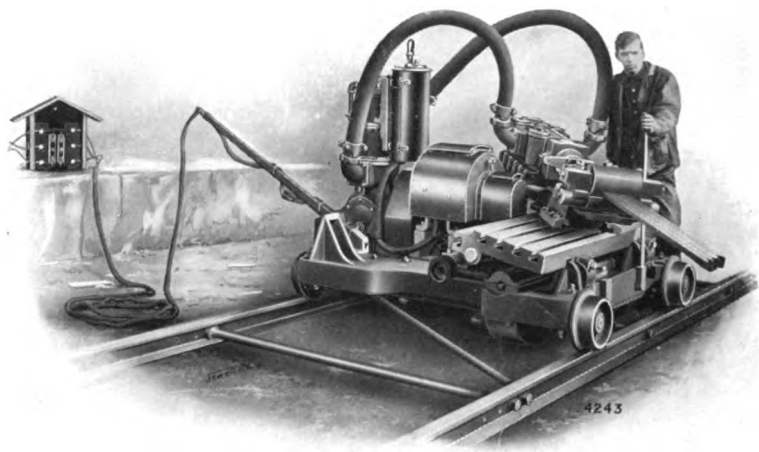


The cylinder and upper head of the "Electric-Air" Channeler, showing the cushioning valves

The pulsator is of the simplest type: one reciprocating piston with one connecting rod, and with no inlet or discharge valves, no jackets, no complication whatever. The moving parts of the pulsator run in an oil bath. The motor is of a standard type designed for the hardest service, with an ample overload capacity. It is geared to the pulsator and also through a friction clutch to a reversible

traction gear, causing the travel of the channeler along its track.

The motor and connecting gears are protected by the sheet steel cover. The controller is of an enclosed dust-proof type. The vertical feed of the cutting engine is regulated by hand. The patented Sergeant roller guide replacing the heavy crosshead and



Illustrating the wide range of adjustability in the swing back and swivel head of the "Electric-Air" Channeler

guides has eliminated practically all of the friction formerly so excessive at this point.

No channeler is so simple in construction, has so few parts to wear out and so little mechanism to need attention, or is so easily operated as the "Electric-Air" Channeler.

## Adjustability

Perfect control of the quality of the blow delivered, and ready adjustment to varying conditions, are provided, by means of the adjustable air pressure and the cushioning valves, shown in the illustration of the cylinder on page 5. The number of blows per minute can be regulated within a wide range by means of the motor controller. The swing back has a range of adjustment from vertical to horizontal. The swivel head has a swing up to  $45^{\circ}$  either side of vertical. The roller guide gives a peculiarly free-running, rapid-cutting machine and a tremendously effective blow. The perfect adjustability of the "Electric-Air" Channeler is of special value in marble quarrying, where the character of the blow must be adjusted exactly to the nature of the marble cut, so that the latter may not be injured. Control of feed and track travel are all conveniently located to the operator's hand without it being necessary for him to change his position.

## Other Advantages

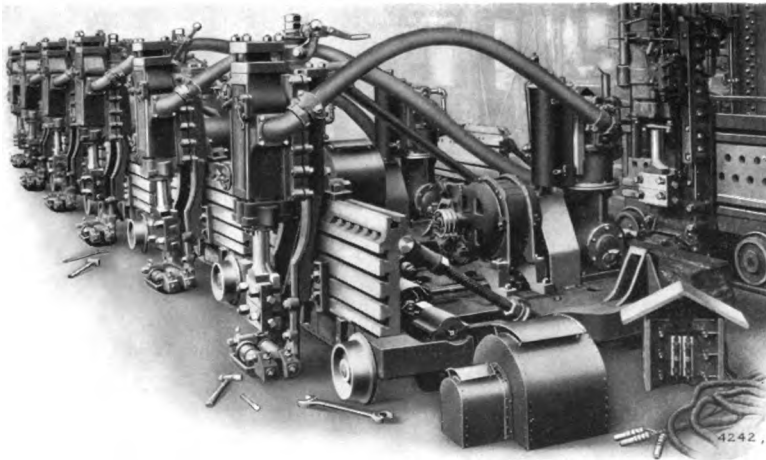
The large reduction in power required by the "Electric-Air" Channeler makes possible a much smaller power plant, including boilers, engines and generators. This means a smaller investment and a lower interest charge as well as a reduced fuel consumption.

The use of the "Electric-Air" Channeler substitutes electric wiring in the place of piping, thus avoiding the difficulties of condensed moisture, freezing up or bursting of pipe lines in cold weather, and delays while the pipes are being thawed out. It is much easier to change transmission lines than to alter pipe-line layouts. The absence of coal and ashes from the quarry results in a superior quality of stone free from surface discoloration.

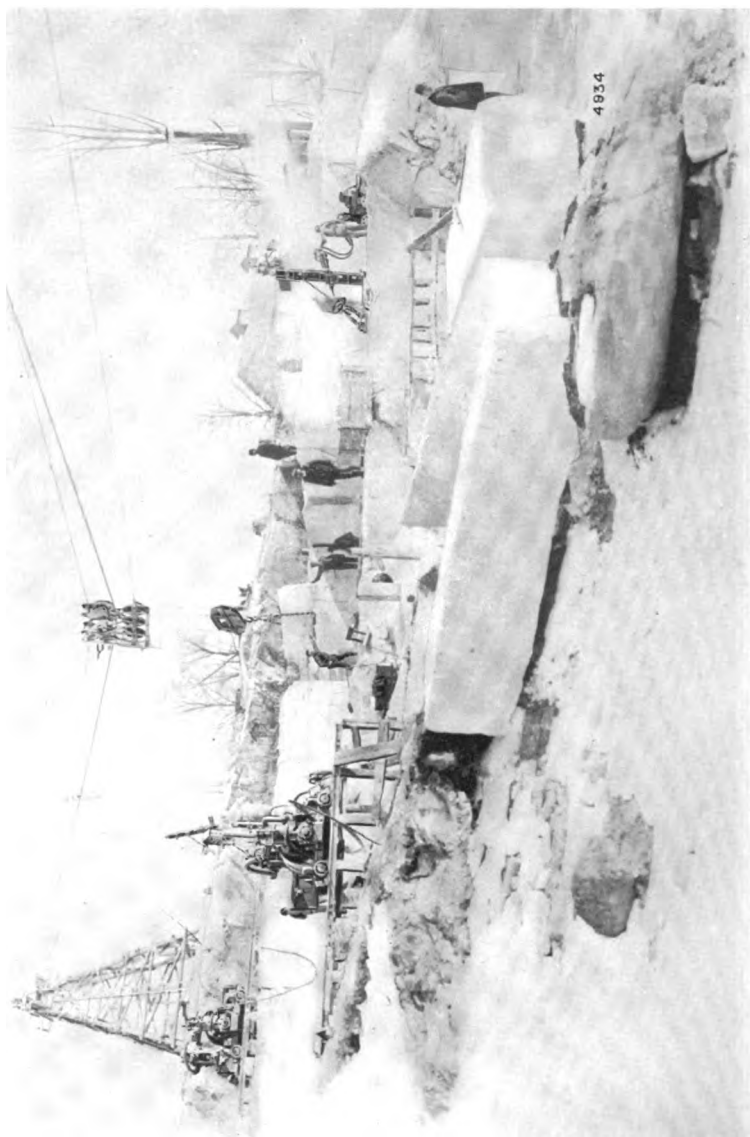
The electric power may be used for hoists and other purposes around the quarry plant. This new channeler, together with the "Electric-Air" Drill, makes it possible to put a quarry on an "electric" basis throughout without sacrificing any of the advantages peculiar to the use of compressed air for rock drilling and channeling.

## Character of Current

The Company considers as standard, and recommends for all new installations, either 220 volt direct current, or 220 volt 3-phase, 50 or 60 cycle alternating current. The adoption of these stand-



A single order for "Electric-Air" Channelers; six complete outfits



"Electric-Air" Channelers and "Electric-Air" Drills on Gadder Frames in the Quarry of the Dover White Marble Co.,  
South Dover, N. Y.

ards is the result of observations on several hundred "Electric-Air" Drills and on a number of "Electric-Air" Channelers operating under a wide variety of conditions. The "Electric-Air" Channeler, however, will be furnished to conform with any existing electrical conditions, as to voltage and character of current, whether direct or alternating. But a voltage of 220 is a safe, practical and reliable pressure for "Electric-Air" Channeler and Drill operation and it is sufficiently high for economical electrical transmission. The motors for this pressure are sturdy, dependable machines, and standard repair parts are always to be had at short notice. "Electric-Air" Channelers and Drills seldom work under ideal conditions for electric motors; moisture and dirt must usually be anticipated. A voltage of 220 reduces troubles in such cases to a minimum, while above this limit it is safe to say that difficulties will increase rapidly.

## Guarantees

The "Electric-Air" Channeler is built in only one size, full specifications of which will be found tabulated on page 11. The machine is put out under the following guarantee:

THE "ELECTRIC-AIR" CHANNELER IS GUARANTEED TO BE EQUAL IN CUTTING CAPACITY TO ANY STEAM OR AIR DRIVEN CHANNELER OF STANDARD SIZE, OPERATING AT 100 POUNDS PRESSURE, AND IN DOING THIS WORK IT WILL USE NOT MORE THAN ONE-HALF THE POWER REQUIRED BY THE EQUIVALENT STEAM OR AIR DRIVEN CHANNELER.

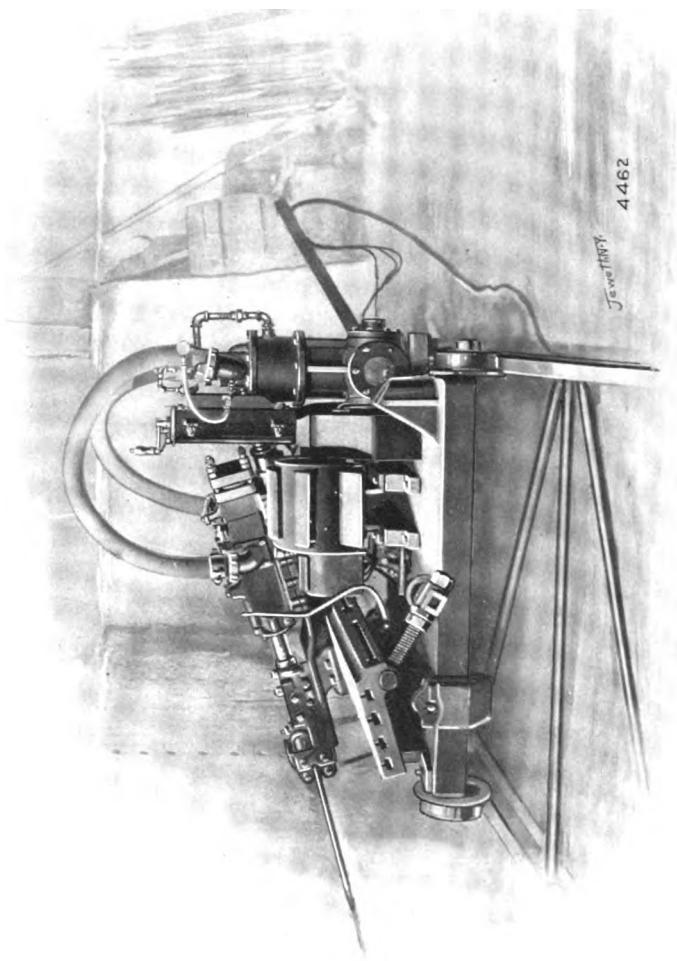
## Equipment

One complete "Electric-Air" Channeler outfit includes the following:

One "Electric-Air" Swing Back, Swivel Head Track Channeler mounted on a rigid cast iron truck with single flanged truck wheels.

One pulsator rigidly mounted on the truck; one motor, either 220 volt direct, or 220 volt, 3-phase, 50 or 60 cycle, alternating current; and one speed-changing controller.

In addition to the above the following accessories are provided: 30 feet of flexible protected drag cable with connections; one drag pole; three 12-foot sections of track and one 6-foot section; one set of lifting bales; one spare chuck clamp; one main fuse box; a full set of wrenches; a full set of tools; and selected extra parts covering both the mechanical and electrical parts of the equipment. Channeler steels are furnished only on order, at extra cost.



"Electric-Air" Channeler at Work 185 Feet Below the Surface in a Quarry of the Vermont Marble Co.  
Making an Undercut to Remove a Block

## SPECIFICATIONS FOR THE "ELECTRIC-AIR" TRACK CHANNELER

Diameter of Cylinder . . . . .	7 inches
Length of Stroke . . . . .	7 inches
Length of Feed . . . . .	12 to 15 inches
Angular Range of Swing Back . . . .	Vertical to Horizontal
Angular Range of Swivel Head . . . .	45 deg. either way
Inside Gage of Track . . . . .	5 feet 10¾ inches
Minimum Distance of Cut from Vertical Wall . . . . .	7¼ inches
Distance from Center to Center of Cuts with Channeler Reversed on Track . . . .	7 feet 5 inches
Distance from Extreme Outer Edge of Rail to Center Line of Cut . . . . .	5½ inches
Length Over All . . . . .	5 feet 3 inches
Width Over All . . . . .	8 feet
Height Over All from Top of Rail . . . .	6 feet 3½ inches
Weight of Channeler with D. C. or A. C. Motor, Pulsator and Speed Controller . . . . .	8,200 lbs.
Total Shipping Weight of Channeler complete with D. C. or A. C. Motor, Accessories and Track Equipment, but no Steels . . . . .	13,250 lbs.
Size of Motor supplied for Alternating Current . . . . .	12 H. P.
Size of Motor supplied for Direct Current . . . . .	15 H. P.
Power Required to Cut 7 feet deep . . . . .	10 H. P.
Number of Running Points on A. C. Controller . . . . .	8 forward, 8 reverse
Number of Running Points on D. C. Controller . . . . .	5 forward
Type of A. C. Controller . . . . .	Reversing Drum
Type of D. C. Controller . . . . .	Non-Reversing Drum



Another View of the Dover White Marble Co.'s Quarry,  
Showing "Electric-Air" Channeler and Drills at Work